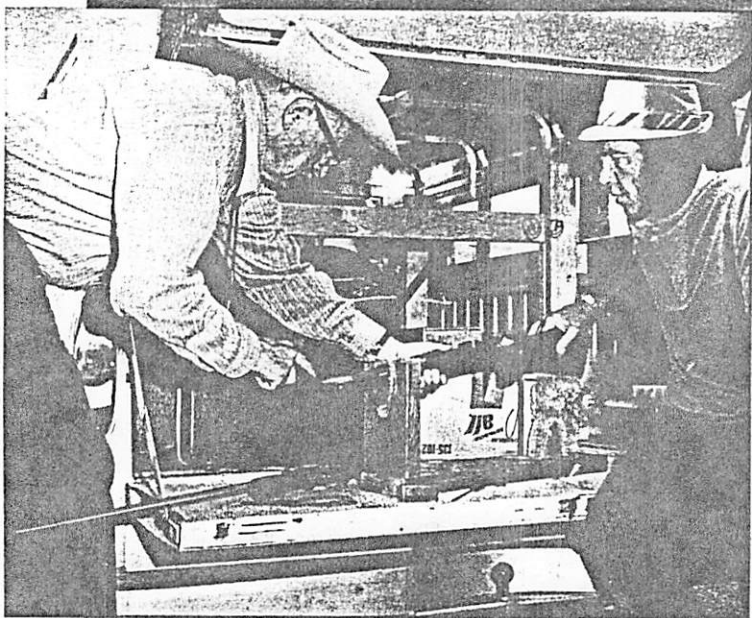


RIFLE BARRELS AND ACCURACY

Titus barrels are well known for their accuracy and quality. Dave Huntington, the new owner and operator of the company is keeping that tradition alive.

*don't just take pictures!
see how old
it is. Was dad's &
unless how old
he really was*

Bowman gives the stock a slight going over with a barrel rasp to remove forend wood that was applying pressure. He likes his barrels to be free floating.



Bliss Titus, left, has now retired and has sold the shop to Dave Huntington who upholds the Titus tradition in the manufacture of super-accurate target and sporter barrels.



the excellency of their product, although their output is not large.

Nearly all of these expert barrel makers were masters at the art of hand-lapping. Although the machining was as perfect as the individual operator could make it, the hand-lapping of the interior of the barrel was what made near-perfect *uniformity* throughout the length of the barrel. This is true of all

top quality bench rest barrels made and used in this country. Barrel makers like Clyde Hart, Ed Shilen, or any of the other experts are masters of this art. Because quantity production is desired by most large gun manufacturers today, they do not attempt to hand-lap barrels as a rule. Remington, who makes the well known 40X and 40XBR rifles, hand lap all barrels for

these rifles. They feel this is necessary to get the accuracy they want in these guns.

About a year ago I heard rumors that Bliss Titus was going to retire and I wondered what would happen to his barrel making business. This spring I met the new owner of the Bliss Titus Barrel Company at a gun show here (Continued on page 68)



The proof is in the shootin'. Dave Huntington, new owner of the Titus operations at right, looks on as Bowman puts the new barrel through its paces. A Remington 20X Target scope is mounted on the rifle. Test group measured .738" horizontal and .400" vertical spread.

By LES BOWMAN

LOCATED AT THE junction of highways 189 and 40, about 50 miles southeast of Salt Lake City, Utah, the town of Heber is not a very large one. It has scenery and good weather in abundance but is certainly not a commercial city. However, here in this small town, for nearly three decades, some of the most accurate rifle barrels have been produced.

Although Heber is right in the center of Utah's good hunting country most of these barrels have been shipped out to gunsmiths and gun buffs, in this country and foreign countries; wherever hunting is a popular sport. They have been available in most all calibers, from the .22 to the .458. All these good barrels had the name "Bliss Titus" stamped on them and a shooter handling a rifle equipped with one of these barrels would take it for granted that it was of superior accuracy without asking.

Bliss Titus, who is now in his late seventy's, learned his trade, generally, in government work. After World War II he set up a shop in a small building on the back part of his home lot in Heber. This is where he started his barrel making and it has been changed very little in the following

years. It was definitely a one man shop. He was determined that the name "Bliss Titus" stamped on a barrel would always represent the top effort of the maker in the art of producing excellent and accurate barrels.

Any customer of Bliss was considered to be an important one and all barrels turned out were given the same careful treatment. I remember my first introduction to a Bliss Titus barrel. This was in an article by Jack O'Connor in *Outdoor Life* and it told of the excellent .270 caliber barrel that had been installed on his gun by Titus. That barrel accounted for a number of trophy animals taken by Jack. I have also had the pleasure of shooting rifles barreled by Titus and I haven't ever found a mediocre one. Consistency is a word that describes them very well.

Titus didn't have the fastest machine tools for his work but he did have very accurate ones. Also, he had the facility to properly sharpen his tools and to use them in a way that produced a nearly perfect product. His rifling machine is one of the most accurate in controlling the twist rate of the rifling that I have ever seen. This is an important quality, even today, with all the new production machinery.

A short time ago, while working as consultant to a large firearms company

who was buying their barrels from an independent barrel-maker, I found that one group of barrels had a twist that varied up and down the length of the barrel. I made some tests with them in actual shooting groups and these groups looked more like shotgun patterns than rifle groups. These barrels had been made using the button rifling process that has become so popular for production barrels in the last few years. However, I believe the new modern hammered or forging process is now taking precedence.

When the button rifling process first came out Bliss Titus made no effort to change to this process although it did speed up barrel making. It presented several new problems, such as building up high internal stresses in the steel that made it necessary to conduct one or more stress relieving heat treatments during the manufacturing process in order to get a high quality product. Bliss continued with his original cut groove process as many of the other successful small shops did. Among these early shops at that time are names still quite familiar to the gun buff today. Buehmiller of Montana, Hobough, also of Montana, Apex of Los Angeles, and P. O. Ackley, now of Salt Lake, are some of the barrel makers still in business and still known for

David Huntington


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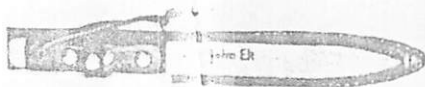
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serting components and crimping on some models of tools to avoid distorting or damaging the finished round. I have had great success using the Ponsness-Warren Model 375 Duomatic loader. This machine has a number of unique features that help produce quality reloads in any gauge. The tool is of the centerpost design but the shell table rises to the tools rather than the tools descending to the shell table. This arrangement makes for greater strength and stability compared to conventional center post machines.

The shells are full-length sized in a single die that is then moved under successive tool stations by means of a radial positioning arm. The reloader does not have to remove then reinsert the shells manually between stations. The shells stay in the full-length sizing die until they are finished; this means no bulged sidewalls or crooked crimps. Finished reloads are hard to tell from factory new.

Tooling on the Duomatic is held in a one-piece casting head. One head holds tools for two gauges. My Duomatic has two separate tool heads, one holding 12 and 20 gauge, the other 28 gauge and .410. The Duomatic changes quickly from one gauge to another in a matter of minutes with no fuss about readjustments and trial

runs. Once the tools are set, they go right back to "zero" no matter how many times the tool head is changed. I can comfortably run 250 loads an hour through the Duomatic. This is a versatile, high-quality tool, ideally suited to the reloading of several gauges and moderate quantities.

In all probability, the 28 gauge is not going to become vastly popular for field shooting. The great majority of rounds shot in this bore are on the skeet fields, only because it is a recognized national shooting event. The 28 is redundant of 20 gauge performance and for this reason the established position for the 20 gauge will go unchallenged. Possibly the main appeal for the 28 gauge afield is esoteric; it is an unusual loading for discerning sportsmen. Guns made for the 28 have a grace and appeal not approached by any other standard guns. Remington is now offering its light-weight frame in 20 gauge, and it should prove exceptionally popular.

In my opinion, the self-loading shotgun is the ideal mechanism for 28 gauge shooting and the Remington M1100 is presently the king in this field. The SA Skeet model with a spare modified choke barrel will give an uplift and a challenge to the unusual sportsman who wants something out of the ordinary.

RIFLE BARREL ACCURACY

(Continued from page 21)

in Salt Lake. He is Dave Huntington of Heber and he had an exhibit of barrels at the show. The work looked very good and I felt I would like to know more about the new owner and what he planned on in the way of maintaining the excellence of the product Bliss Titus had spent so many years building up.

Dave was pleased with my interest and urged me to come to Heber and see his shop. I looked up Bliss when I got there and we spent a long couple of hours reminiscing on long gone days and the gun business in general. He said he had sure hated to think of his barrel making business just dying out but hadn't known what to do about it until a local boy talked to him about buying the shop and equipment. At the time he was still at the University of Utah but on graduation he was ready to take over. Bliss spent many months in his shop with young Dave, training him in all the aspects of the barrel making business as he knew it. He still visits the shop for a short time each day to give any help he can.

These small shops that are equipped

only with a few semi-automatic lathes and other necessary tools certainly won't flood the market with barrels. Working steadily, a good craftsman can turn out about five barrels in blank form in one day or about two finished in contour, etc. However, they do supply a definite source of barrels for the custom gun builder who wants a superior barrel for the rifle he may be rebuilding or for a new one he is custom making for someone else.

I watched Dave at work for some hours and I checked one of his finished hand-lapped barrels. Uniformity was excellent. If it wasn't exactly in the bench rest class it certainly was premium varmint class type. I ordered one of his barrels and on his next trip to town he picked up one of my Remington 700 actions to put it on. This action would provide no excuse for any inaccuracy by the barrel. I told him that when he had it barreled I would like to come to Heber and shoot it before it was blued. A week later he called and said it was ready. One of my shooting companions, John Jobson of Sports Afield, said he would like to see what

this combination would do so we drove over to Heber to try it out. John also had a friend of his along who proved to be a good shot too. We were prepared to give it the full treatment.

Dave told me that the barrel was a bit tight in the fore-end and since I didn't want any excuses for lack of accuracy I got my field tool kit out and eliminated that problem. After mounting a 12X Leupold Varmint scope we were ready for the range. I had my well-built, solid shooting bench in back of the pickup and some good sandbag rests. Although it was windy, about 15 to 18 miles per hour, I didn't anticipate too much trouble. I had brought some of my pet test loads along for this .22-250. These were Remington cases, the new 22 grain Remington Bench Rest bullet I had been trying out and 35 grains of Norma 203 powder. The first group was a very good $1\frac{1}{4}$ " horizontal with $\frac{3}{4}$ " vertical. In fact, four shots were in one cluster. I'm not sure if it was me or the wind on the fifth shot that went wide. We made a number of groups right in this class and the gun consistently shoots under one inch groups with these handloads. I had no chance to make comparative tests with factory loads as the wind finally increased to 25 to 30 miles per hour and we had to quit. Anyway, I was more than pleased with this new light sporter barrel on the standard Remington sporter stock. Now the barrel is being polished and blued.

John Jobson was as elated as I was with the results and left an action with Dave for rebarreling to the same .22-250 caliber. I am planning on having Dave put a .270 barrel on one of my better actions and expect it to shoot as well as this one.

I wanted this barrel free-floated to give it a real test. During a good many years of test work on rifles I have found that any gun of top quality will shoot its best with a free-floating barrel and a well bedded action. Only when they have some interior defects do they need to have any cushioning effect applied to them to dampen or control vibration. I have heard some shooters insist that they needed 5 pounds upward pressure or some other such thing necessary to get some guns to shoot well. I'm sure this is so because I have a number of rifles with the same characteristics. However, I am convinced that it's something about the barrels that make them vibrate inconsistently or too much. Tight and loose spots within the length can be one of these things. This condition exists with all barrels, to some extent, regardless of how they are made, unless they have been

handlapped by an expert.

Twists that vary the length of the barrel, rough spots and other defects can affect vibration. The only barrels I have examined that are nearly perfect, coming right off the machines, with no handlapping, are those made by the hammer or forge process, over a mandrell with inverted lands and grooves cut on it. Even some of these have defects that alter their performance. If I were asked what conditions contributed most to inaccuracy in a barrel I'd say, tight and loose spots through the length of the barrel as number one and any bell muzzle condition as a close second.

All barrels vibrate when the gun is fired but it is the consistency of the vibrations that is important. If you wish to check this just put one of the new Collimators on a rifle muzzle, then look through the scope while lifting up, pushing down or sideways, or moving it any way. Any upward pressure on a barrel is merely bending it to some extent. This can dampen the vibration and can sometimes help promote accuracy from that particular barrel.

Most bench rest barrels that I have seen are full-floated. The shooter is after the ultimate in accuracy. Barrel makers who furnish the bench rest shooter a barrel try to get them as nearly perfect as they can be made. This is the type barrel I want on my varmint and hunting rifles. My own error of holding is bad enough that I certainly don't want to compound it by any unnecessary amount of built-in gun error. Numerous tests that I have made show that floated barrels have less tendency to change groupings regardless of different holds or positions on the fore-end, when using a rest. They are also less sensitive to a tight or loose gunsling.

I am not going to comment on barrel straightness. Probably there isn't an absolutely straight barrel being used. Personally, I prefer a barrel that doesn't need straightening. I have had some unpleasant experiences using barrels that had been excessively straightened. If a barrel comes from a machine so crooked that it really needs to be straightened I'd just as soon not shoot it. Most good barrel shops feel the same way. Some barrels that seem quite crooked can shoot bench rest type accuracy, if the bend is all one way and the interior perfect. Clyde Hart told me he had a shooter who actually preferred a barrel that was slightly bent. He used it for bench rest shooting. Some shooters claim that a straightened barrel will change grouping as it warms up.

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Many of the older and very good barrel makers would not ever straighten a barrel. Bliss Titus wouldn't and Dave Huntington follows this same practice. If the barrel is so bad that it is necessary to straighten it, then junk it.

There is nothing unusual about a Titus barrel. They are standard 6 groove, of regular depth grooves, that have proven to be long life barrels during many years of use. Care is used in determining that no barrel has undersize bore or grooves.

After the barrel is contoured and the threads cut, Dave cuts the length to the desired amount. Extreme care is used in the crowning operation and then the barrel is ready to be blued and fitted on the rifle.

The barrel making business has seen many changes during the past few years. Originally, all rifling was cut, with certain type tools. Then "button" rifling was developed. Factories as well as independent barrel makers adopted it because it was considerably faster than the cut method. However, it had many inherent faults that had to be eliminated through experience. One problem was that it set up very intense internal stresses in the barrel metal so that when the blank was contoured it opened up at the muzzle (bell muzzle), while still staying very tight at the breech end. To correct this the barrel blank had to be stress relieved from one to several times during manufacture. This increased the cost so it was often just disregarded by some. A barrel with even a slight amount of bell muzzle usually shoots poorly.

Barrels made by the cut rifling process can also open up at the muzzle and sometimes, when being contoured. To eliminate most of this problem, after the bars of barrel steel are cut to workable lengths of 32 to 36 inches, they are stress relieved before starting any of the machining.

In the last few years another process has become popular with the larger arms companies. This is the hammer or forging process, originally developed in Europe. However, this is not one for the small or independent barrel maker. Machines to do this work are large and costly, up in the \$100,000 to the half-million dollar bracket. This method is constantly being improved and with the best machines and well trained operators, these machine-finished quality barrels are now in the top varmint class in accuracy. However, it still takes a handlapped barrel, in addition to the very best machine work, to make the super accuracy barrels required for bench rest rifles.

There are still as excellent barrels as any being produced today, made by the skilled worker using the cut rifling method. I doubt very much that any of these small shop barrel makers will ever amass a fortune from their work but they are turning out a product that gives the owner of one a feeling of pride and satisfaction that is hard to beat.

Some of the independent barrel makers are turning out Chrome Moly and Stainless Steel barrels but most of them are concentrating on Chrome Moly because it can be sold at about half the cost of one made of Stainless Steel. So far, all Bliss Titus barrels are Chrome Moly. The biggest advantage of Stainless Steel is its prolonged resistance to erosion. In other words, it's longer barrel life as measured in terms of the number of rounds that can be fired through it without affecting its accuracy. The bench rest shooter puts a lot of ammo through his rifle barrel, working up special loads and in practice. On the other hand, the average varmint shooter, hunter or target shooter uses considerably less ammo and for this type shooter a Chrome Moly barrel is definitely sufficient. It should last him a lifetime.

There are a few exceptions where Stainless Steel barrels are almost a necessity, if trouble free service is desired. An outstanding example of this is the new extremely high velocity .17 caliber magnums, such as the new Remington .17 Magnum and the .17 Sharps Magnum, one that I have worked with a considerable amount. These definitely require the most carefully made, smoothest interior, Stainless Steel barrels that can be obtained, because of the high velocity and heat they generate. There are a few other high velocity, high energy calibers that will last better and retain their best accuracy if Stainless Steel barrels are used.

For the average run of calibers from the .222 case head size up to the elephant size cartridges, a good Chrome Moly Steel barrel, used by all the larger factories today, is sufficient.

It looks like the future of the small barrel maker is a bright one as long as they keep the quality of their product up. There is plenty of business for all as the average shooter of today is giving more attention to the accuracy of his rifle than ever before. He may not be asking for barrels that shoot $\frac{1}{4}$ inch groups, like the bench rest rifles, but he does want barrels that have excellent varmint accuracy as well as superior hunting accuracy. This is what he will get in a Bliss Titus Barrel.